

A	B	C	D	E	F	G	H
RTO	Requirement	Study or Task	Study Performer	Results	Status	Cost Impact	Reference
1	SPP SPP Planning Criteria: Criterion 3.5 "Interconnection Review Process" <a href="https://www.oasis.oati.com/SWPP/SWPPdocs/SPP_Criteria_&amp;_Appendices_July_29_2014.pdf">https://www.oasis.oati.com/SWPP/SWPPdocs/SPP_Criteria_&amp;_Appendices_July_29_2014.pdf</a>	<i>Steady State Assessment of the Grain Belt Express Clean Line HVDC Project (2013)</i> <i>Dynamic Stability Assessment of Grain Belt Express Clean Line HVDC Project (2013)</i> Combined, these studies are referred to as the: <b>"SPP Criterion 3.5 Studies"</b>	Grain Belt Express, via their consultant <b>Siemens PTI</b>	The report identifies potential impacts to the SPP electric system that could occur during abnormal system events that affect operation of the Project.  Remedial Action Schemes and/or Operating Guides are identified that can be implemented to ensure stability in the SPP region during abnormal system events,	Complete	None.  The cost to implement one or more RAS and/or Operating Guides is inherent in the cost of the Project facilities. This has been the experience on other Clean Line projects as well.	Galli Direct pp. 19-23, 36.  Galli Surrebuttal pp. 3, 10, 25-26, 31-32, 38.
2	SPP See B2; SPP confirmation of the results of task C1.	<i>Grain Belt Express HVDC System Impact Study, Final Report for Southwest Power Pool (September 2013)</i>	SPP, via their consultant <b>Excel Engineering, Inc.</b>	The report identifies Remedial Action Schemes or Operating Guides that ensure stability in the SPP region as a result of contingency events on or nearby the Project facilities.	Complete	See G1.	Schedule AWG-9  Galli Direct pp. 21-22.  Galli Surrebuttal pp. 3, 10-11, 25-26, 29-30, 38.
3	SPP See B1.	<i>Generation Interconnection Facilities Study Report For GBX Clean Line High Voltage Direct Current Facility In Ford County, Kansas. March 19, 2015</i>	ITC Great Plains	The report provides a cost estimate for the interconnection facilities to accommodate the Project's interconnection with SPP.	Complete; Interconnection Agreement executed and filed at FERC.	The report estimates costs to interconnect the Project at \$21,448,762.	Galli Direct pp. 5, 12, 19, 23.  Galli Surrebuttal pp. 3.
4	SPP See B1.	SPP Criterion 3.5 Refresh Studies	HVDC Manufacturer for the Project.	Not yet started	To begin in 2018 when detailed HVDC design is underway.	See G1.	Schedule AWG-9  Galli Direct pp. 21-22.  Galli Surrebuttal pp. 3, 10-11, 25-26, 29-30, 38.
5	MISO MISO FERC Electric Tariff, Attachment X "Generator Interconnection Procedures (GIP)" <a href="https://www.misoenergy.org/Library/Repository/Tariff%20Documents/Attachment%20X.pdf">https://www.misoenergy.org/Library/Repository/Tariff%20Documents/Attachment%20X.pdf</a>	<i>MISO Interconnection Feasibility Study for Queue Position J255, October 2012</i>	MISO	The Feasibility Study, completed in October 2012, did not identify any constraints associated with the 500 MW injection into MISO.	Complete	Superceded by Optional Study.  See G7.	Galli Direct pp.27-28.  Galli Surrebuttal pp. 3, 38.
6	MISO See B5.	<i>Midwest ISO SPA-2014-May-Missouri System Impact Study Final Report (November 2014)</i>	Ameren Services Company - Transmission Planning	The analysis uncovered no injection-related constraints for the 500 MW Maywood interconnection.	Complete	Grain Belt Express estimated network upgrade costs after receipt of the SPA Study report at "less than \$10 million."  Superceded by Optional Study.  See G7.	Galli Direct pp. 6, 28, 30.  Galli Surrebuttal pp. 3, 9-10, 12-13, 38.
7	MISO See B5.	<i>MISO Project J255 Clean Line Energy Grain Belt Express, 500 MW in Ralls County, MO Optional Study Report, (January 2017)</i>	Ameren Services Company - Transmission Planning	The study showed that the Project will cause a constraint on two transmission elements that will require Network Upgrades to accommodate the Project.	Complete	The report estimates costs to interconnect the Project will be \$9.5 million (in line with Grain Belt Express estimates).  The report also estimates costs to mitigate constraints identified as a result of local planning criteria will be \$11.5 million.  The total estimated cost of network upgrades in MISO is estimated to be the summation of these: \$21 million.	Schedule AWG-8  Galli Direct pp. 6, 12, 30.  Galli Surrebuttal pp. 3, 9-10, 12-14, 20, 38.

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8	MISO	Expected modifications to MISO FERC Electric Tariff, Attachment X	MISO Definitive Planning Phase (DPP)	Ameren Services Company - Transmission Planning and MISO	Not yet started	Grain Belt Express plans entry into the MISO DPP upon conclusion of the Missouri regulatory approval process.  After the DPP, Grain Belt Express, MISO, and Ameren Missouri will negotiate, execute, and file with FERC, an Interconnection Agreement.	See G7. Estimate to be refreshed in the DPP.  Galli Direct pp. 28-30 Galli Surrebuttal pp. 10-12, 14, 20.
9	PJM	PJM Open Access Transmission Tariff: <a href="http://pjm.com/media/documents/merged-tariffs/oatt.pdf">http://pjm.com/media/documents/merged-tariffs/oatt.pdf</a>  PJM Manuals 14A, 14B and 14E: <a href="http://pjm.com/library/manuals.aspx">http://pjm.com/library/manuals.aspx</a>	<i>PJM Interconnection Feasibility Study report (2013)</i>	PJM and American Electric Power	Thermal overloads were identified requiring mitigation for further review in the System Impact Study.	Complete  Superseded by System Impact Study.  See G11.	Galli Direct p. 24. Galli Surrebuttal pp. 4, 38.
10	PJM	See B9.	Grain Belt Express Project HVDC Model Development and Testing  Required in order for PJM to be able to perform Impact Study (October 2013, March 2015, August 2015)	Grain Belt Express consultant TransGrid Solutions, Inc.	A steady state and dynamic model was developed, tested, and delivered to Grain Belt Express for use in RTO interconnection studies.	Complete  Not applicable	Galli Direct p. 36. Galli Surrebuttal pp. 3-4, 11, 21-22, 38.
11	PJM	See B9.	<i>Merchant Transmission Interconnection PJM Impact Study Report For PJM Merchant Transmission Request Queue Position X3-028 Breed 345 kV (October 2014)</i>	PJM and American Electric Power	Thermal overloads and stability constraints were identified along with mitigation in the form of network upgrades. Additional issues were identified as requiring further review during an in-progress re-tool study.	PJM is actively re-tooling this study with an anticipated result in March 2017.  The report estimates costs to interconnect the Project will be \$3,447,100.  The report also estimates costs to mitigate constraints identified as a result of planning criteria will be \$501 million.  The total estimated cost of network upgrades in PJM is estimated to be the summation of these: ~\$505 million.	Galli Direct pp. 24-27. Galli Surrebuttal pp. 4, 18-19, 21-22, 24-26, 38.
12	PJM	See B9.	PJM Facilities Study	American Electric Power	Study Underway	After the Facilities Study is complete, Grain Belt Express, PJM, and AEP will negotiate, execute, and file with FERC, an Interconnection Service Agreement  See G11. The Facilities Study is a fine-tuning of the cost estimates from the System Impact Study.	Galli Direct pp. 26-27. Galli Surrebuttal p. 23.